SD Instruments

SR-LAB™

SDI Startle Response System

"Designed by Scientists for Scientists"

Over 20 years of use in scientific research • More published studies than any other startle system

SR-LAB™
Startle Response System

Complete SR-LAB test station with animal enclosure installed in the isolation cabinet

The SR-LAB™ Startle Response System – the world's most widely used system for startle reflex measurement and by far the most successful for fear potentiated startle and pre-pulse inhibition testing. SR-LAB provides a complete hardware and software solution for a wide variety of startle applications. The system can be configured with up to 16 stations for testing large subject groups Intuitive yet powerful features cater to users from the educated non-specialist to the sophisticated behaviorist.

SR-LAB takes full advantage of the Windows® operating system with data organization and management software that combines power and flexibility with ease of use. SR-LAB software controls virtually any combination of tones, noise bursts, lights, air puffs, background noise and foot shock options. Flexible data organization and management software provides the ability to configure multiple test stations, allowing rapid testing of a large number of subjects. Importantly, SR-LAB supports multiple test paradigms without requiring costly add-on kits or additional software.

The SR-LAB™ Startle Response System is the world's most widely used startle system and by far the best for testing startle habituation and pre-pulse inhibition.

Features & Benefits

- Supports all startle paradigms including startle habituation, pre-pulse and cross-modal inhibition, fear potentiated startle, trace conditioning and gap detection
- Configure up to 16 test stations for rapid testing of large subject groups
- Easy to use software controls all test paradigms
- Plug-in kits for shock, puretone, airpuff and light stimuli
- Results are reported in millivolts, which is a direct read and not a derived figure such as Newtons
- 5 standard animal enclosures with custom styles available
- View Wave™ for data analysis and validation

SR-LAB™ Basic Components

The SR-LAB basic system components include:

- Test cabinet in composite (ABS) or laboratory grade laminate (Prime)
- Animal enclosure in choice of standard sizes
- Power supply
- Input and Output cables
- Animal enclosure base
- Software and User Manual
- Software utilities for data analysis

Other, optional components and accessories can be added to the basic SR-LAB system including tactile (air puff) stimuli, light prepulse kit, extra animal enclosures, standardization unit, and absolute value (Newtons) calibrator. For more information, please refer to the section on SR-LAB Optional Components.

SR-LAB Control Unit

CONTROL UNIT/SOFTWARE

The SR-LAB Control Unit consists of a computer with an I/O board and connection chassis. The Control Unit manages stimuli and monitors responses for up to 16 test stations simultaneously. The unique SR-LAB software eliminates programming by making all operations available from intuitive, menu-driven choices. You are prompted to supply animal and test identifiers which are always stored with the response data. The system controls the presentation of all stimuli. Each animal's responses are displayed on screen and recorded on the hard disk following every trial.

ISOLATION CABINETS

The SR-LAB test cabinets are uniquely designed to permit accurate results in startle reflex testing by limiting inter-subject ultrasonic vocalizations and fear-related pheromones. Each sturdy cabinet permits full and unobtrusive observation of test animals and includes a ventilation fan, light, and viewing lenses. In addition, each cabinet contains a complete sound generation system for white noise production, separately adjustable background noise levels and accessory connections for optional stimuli. Electronic circuitry is enclosed in a separate section of the cabinet. The SR-LAB cabinets are easy to clean and available in two different types – the "ABS" and the "Prime".

Specialized amplifier circuitry, contained in the cabinet, permits the use of a dynamic standardization system that emulates actual startle response movements. The dynamic response sensor design ignores static animal weights enabling the full range of the transducer capacity to be available for response recording.

ANIMAL ENCLOSURES

Animal enclosures are designed to locate the subject without using restraint so the animals do not suffer from restraint stress and confound the results of the startle testing. The SR-LAB enclosures are configured to focus the source of stimuli on the animal's center line - the level of the stimuli is consistent and the animal is free to turn around and make other movements.

The SR-LAB cylindrical animal enclosure monitors animal movements with an ultra-stable, hermetically sealed motion sensor using full 12 bit resolution (a range from zero to over 5000 millivolts) for accurately measuring the wide range of startle responses. The tubular design of the animal enclosure ensures that the animal remains centered over the sensor for consistently reliable results. Other systems with a square animal enclosure permit the animal to be off-center which affects the consistency of the response.

The enclosures are made of transparent acrylic for easy cleaning and convenient observation. All enclosures are adjustable in length and come in five different sizes to accommodate adult and juvenile rats and mice— Small*, Small/Medium*, Medium, Large and X-Large. Also available are slotted enclosures for tethered animals in Small/Medium and Large sizes.

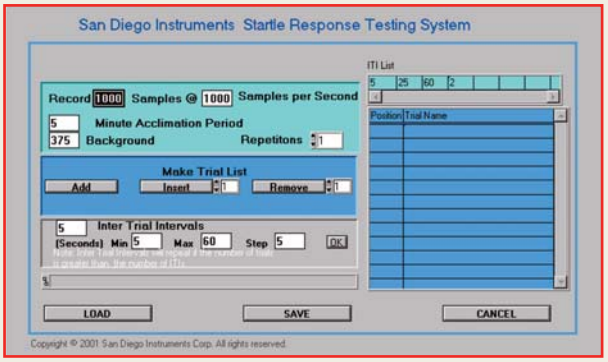
** Ultra sensitive enclosures for mice*

SR-LAB Animal Enclosures

SR-LAB Animal Enclosures

SR-LAB™
Software Features

TEST PREPARATION



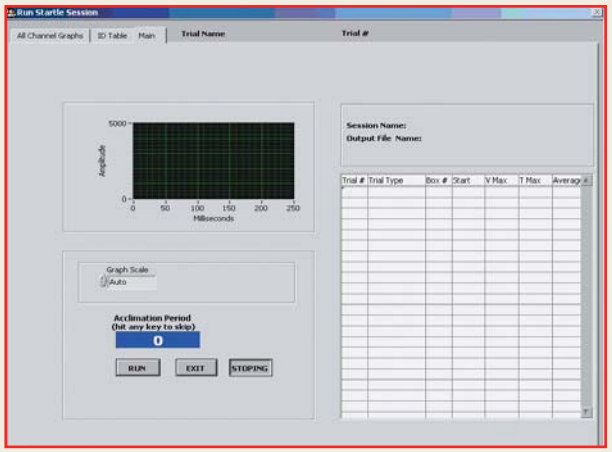
Trial Definitions – you can define a trial to meet your specific needs. Each command in a trial is selectable from a predefined menu. You can control the start time and the duration of each command in the trial.

Session Definitions – you define and edit test sessions by inserting and removing 'Trials' with the click of the mouse. You can manually enter inter-trial intervals (ITI) or take advantage of the 'random ITI generator'. Saved sessions can be edited and renamed.

Diagnostics/Audio Calibration – you can observe response channel integrity and calibrate acoustic stimulus amplitudes directly from the Oscilloscope mode reducing the preparation time needed to establish stimulus levels in startle sessions.

TEST EXECUTION

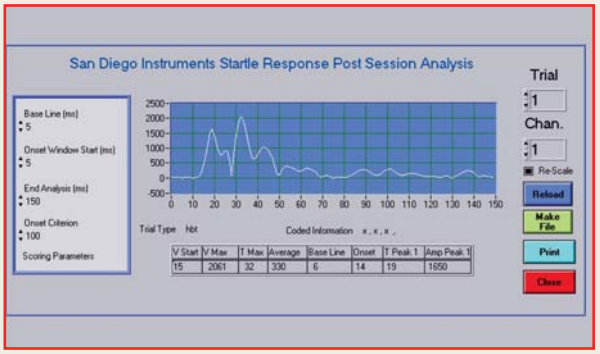
Full "Run Time" Screen - you can monitor the test progress with summary numeric data and response waveforms.



DATA MANAGEMENT

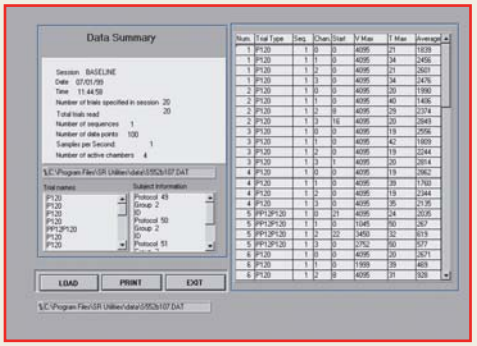
"View Wave™" – This post session data analysis tool allows you to fully verify startle response data. The complete waveform can be reviewed for every response to verify the calculated numeric data. With the use of the Programmable Scoring Parameters, you can refine data via settable parameters that include Baseline, Onset Window Start, End Analysis and Onset criterion.

Response Data Options – The SR-LAB software applications offer greater insight into the animal's response to the startle stimulus.



The expanded data response options included with SR-LAB are "Start, Baseline, Onset time to first peak, Time to maximum peak, Amplitude of first peak, Amplitude of maximum peak, and Average."

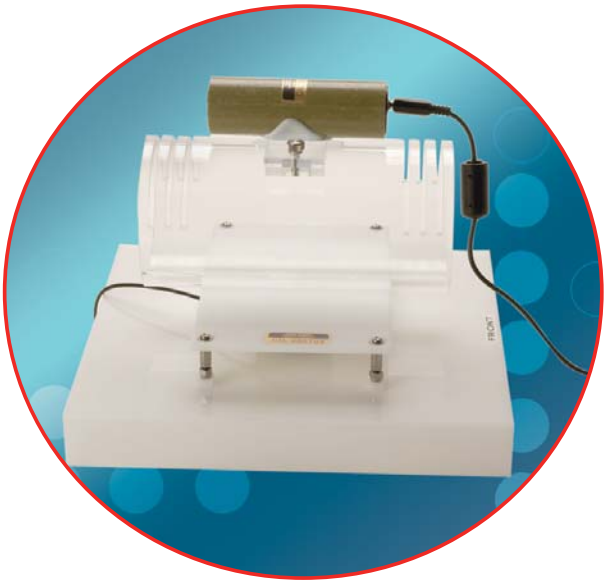
Data Consolidation – SR-LAB software allows you to combine data from multiple startle sessions into a single Excel spreadsheet, into ASCII file format, or your choice of statistical programs. Just 'point and click' on the files to be consolidated and SR-LAB will preview the data and finish the process. The merged data can be sorted by Subject, Group, or ID.



Channel Consolidation – SR-LAB software allows you to define the stations to be run, the channels to be displayed and the subject information you want to include (i.e. Subject, Group and ID) in one Specification Window. Channel specifications can be saved for quick re-use in subsequent high throughput experiments.

CALIBRATION OF SR-LAB TEST CABINETS

SR-LAB Standardization Unit – the SR-LAB Standardization Unit confirms the reliability of all startle animal enclosures; both among enclosures and over time, by transmitting a precise series of pulses to the sensor located on each enclosure. Using the SR-LAB Standardization Unit, you can adjust each animal enclosure to the same base line value, thus standardizing the responses. This unit is highly recommended for any SR-LAB multi-station system.

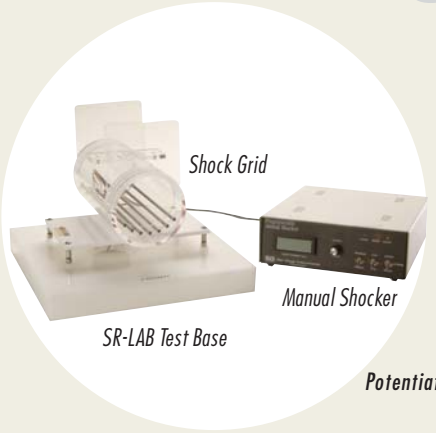


The SR-LAB software contains menu selections to help you plan, execute, and manage data in your startle response testing sessions.

"The SR-LAB Startle Response System from SDI has worked for us for many years, both as a measure of acoustic startle and pre-pulse inhibition."

Eastern U.S. Government Research Lab

SR-LAB™ Plug-In Kits & Accessories



Potentiated Startle Response Kit

A variety of optional system components can be added to your SR-LAB system at any time. The options include: the Potentiated Startle Response Kit, the Tactile Kit (air puff stimuli), the Light Kit for pre-pulse stimuli, the Relay Chassis, the High Intensity Light Kit and the Shock Level Tester.

POTENTIATED STARTLE RESPONSE KIT

The SR-LAB Potentiated Startle Response Kit pairs foot shock with a conditioning stimulus for potentiated startle studies. The conditioning stimulus can be acoustic, light, tactile or user-supplied. The programmable shocker permits you to compose test sessions using either a manually set constant shock level or applying multiple shock levels via the SR-LAB Control Port commands. The shocker's display shows the actual amplitude delivered. The stainless steel shock grid floor slides easily into the enclosure and is removable for cleaning.

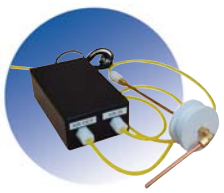
The Potentiated Startle Response Kit is available for all enclosure sizes and includes:

- Animal Shocker – solid state, constant current, feedback controlled
- Shock Grid
- Control Port Interface Board (required only for adjusting shock levels programmatically)
- All cables and connectors

AIR PUFF KIT

Each Air Puff Kit is designed to mount through the opening on the back of the SR-LAB test station. The Test Station Mount (around the tubing) provides a rigid mount for the tubing. The tubing can be moved horizontally through the Test Station Mount to position the tube over the animal enclosure. Once positioned, a set screw in the Test Station Mount locks the tube in position. Each Air Puff Kit includes::

- Solenoid Box
- Test Station Mount
- Tubing

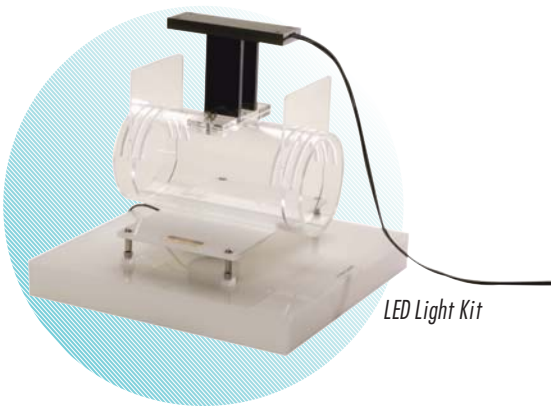

Air Puff Kit

RELAY CHASSIS

The SR-LAB Relay Chassis makes it possible to control lights, acoustic devices and other 12 VDC stimulus devices from the "Port" command in the SR-LAB Trial Definition application. The Relay Chassis contains four solid-state relays that receive communication from the Control Port board and the Port Command. Up to four SR-LAB Relay Chassis can be controlled from one Control Port board.

HIGH INTENSITY LIGHT KIT

The SR-LAB High Intensity Light Kit can be used to induce anxiety in test animals. The light kit uses LEDs that emit 25 to 1500 lumens of light in the SR-LAB cabinet. The high intensity LEDs do not generate heat or electrical noise that could influence an animal's reaction.


LED Light Kit

LED LIGHT KIT

The LED Light Kit serves as an additional pre-pulse stimulus. It attaches to the top of the animal enclosure and connects either to the Shock port or to the AC Relay port on the test station. Connection type must be identified when you order the SR-LAB.

PURE TONE KIT

The Pure Tone Kit provides fixed frequency stimuli through a separate speaker attached to the animal enclosure. This kit is used for specialized startle paradigms (for general PPI testing the white noise generator is used and this kit is not required). The Pure Tone Kit is available in a one frequency, two frequency, or three frequency model. The trial definition in the software allows the user to choose which frequency and control the duration and amplitude of the stimulus. The basic unit supports up to four test stations. For each additional four test stations a matching amplifier is available.

Pure Tone Kit

CONTROL PORT INTERFACE BOARD

This expansion board can be purchased as an optional component with the SR-LAB system. When it is installed in the SR-LAB computer, sixteen signal channels are available for controlling a programmable shocker and other stimulus devices via the SR-LAB 'Control Port Command'.

SHOCK LEVEL TESTER

The SR-LAB Shock Level Tester displays whether or not the shock grid is working properly. Just clip the Shock Level Tester on to a shock grid and set the appropriate shock level on the shocker. The shock level detected will be displayed on the LCD read out and on the SR-LAB Shock Level Tester. You will know that the shock grid is working properly when the shock level entered matches the value displayed on the LCD of the Shock Level Tester.

SR-LAB™ Specifications

Dimensions	ABS Isolation Cabinet - 15" (W) x 14" (D) x 18" (H) Prime Isolation Cabinet - 16'' (W) x 15'' (D) x 23'' (H) Control Box - 16" (W) x 14" (D) x 5 ¾" (H) Small Animal Enclosure - 3 ½" (L) x 1.1" (ID) Small/Medium Animal Enclosure - 5" (L) x 1 ½" (ID) Medium Animal Enclosure - 6" (L) x 2 ¼" (ID) Large Animal Enclosure - 8" (L) x 3 ½" (ID) X-Large Animal Enclosure- 10'' (L) x 5'' (ID) Small/Medium Slotted Animal Enclosure - 5" (L) x 1 ½" (ID) Large Slotted Animal Enclosure- 8" (L) x 3 ½" (ID)
Weight	24 lbs. (ABS Isolation Cabinet), 51 lbs. (Prime Isolation Cabinet), 6 lbs. (Control Box)
Material Composition	ABS Isolation Cabinet: ABS plastic, Prime Isolation Cabinet: Laminate Control Box: Aluminum, Animal Enclosure: Acrylic
Maximum # Stations	16 stations per computer
Standard Cable Lengths	8 ft.
Certifications	CE
Stimuli Options	Tones, noise bursts, background noise, lights, air puffs, foot shocks and user-defined stimuli
Color Options	White

"Designed by Scientists for Scientists"

SR-LAB COMPUTER REQUIREMENTS

Windows XP/Windows 7 compatible computer system with available PCI slot. Minimum disk and memory sizes specified to support Windows XP/Windows 7 are acceptable.

SDI CONFIGURED COMPUTERS

SDI offers high performance Cobalt™ Configured Computers that are pre-installed with the Windows® operating system and applicable SDI software. If required, SDI will pre-install PC Interface cards and all relevant drivers. Each computer is fully tested with your system prior to shipment. When your SDI system arrives, all you have to do is unpack it, attach the cables and begin testing.

SDI STARTLE RESPONSE TEST SYSTEMS

- SR-LAB™
- SR-HLAB™

FOR MORE INFORMATION

To learn more about SDI behavioral testing systems, please visit **www.sandiegoinstruments.com.** If you have any questions or would like to request a quote please call **(858) 530-2600** or email us at **sales@sandiegoinstuments.com.**

To view the online SR-LAB overview presentation, please visit: **sandiegoinstruments.com/presentations.**

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